

for one of the Ghent newspapers. A still more interesting arrangement is possible, and is indicated in Fig. 4. Here a separating condenser is introduced at the intermediate station at Ghent between earth and the line, which is thereby cut into two independent sections for telephonic purposes, whilst remaining for telegraphic purposes a single undivided line between Brussels and Ostend. Brussels can telegraph to Ostend, or Ostend to Brussels, and at the same time the wire can be used to telephone between Ghent and Ostend, or between Ghent and Brussels, or both sections may be simultaneously used.

It would appear then that M. Van Rysselberghe has made an advance of very extraordinary merit in devising these combinations. We have seen in recent years how duplex telegraphy superseded single working, only to be in turn superseded by the quadruplex system. Multiplex telegraphy of various kinds has been actively pursued, but chiefly on the other side of the Atlantic rather than in this country, where our fast-speed automatic system has proved quite adequate hitherto. Whether we shall see the adoption in the United Kingdom of Van Rysselberghe's system is, however, by no means certain. The essence of it consists in retarding the telegraphic signals to a degree quite incompatible with the fast-speed automatic transmission of telegraphic messages in which our Post Office system excels. We are not likely to spoil our telegraphic system for the sake of simultaneous telephony, unless there is something to be gained of much greater advantage than as yet appears.

NOTES

WE are pleased to be able to announce that Prof. Flower's title is to be "Director" of the Natural History Museum, South Kensington, not "Superintendent," as Prof. Owen was styled. According to the Civil Service Estimates for the present financial year his staff consists of four keepers of departments (Botany, Geology, Mineralogy, and Zoology), two assistant keepers (Geology and Zoology), eleven first-class assistants, and fourteen second-class assistants. Large as this number may seem, it is notorious that in the Zoological Department at least a considerable reinforcement is required before the work can be expected to be efficiently performed.

WE regret to learn from the *Times* that M. Dumas, the venerable *Secrétaire perpétuel* of the Academy of Sciences, is lying in a critical state at Cannes.

POPE LEO XIII. has erected at his own expense at Carpineto-Romano, his native city, a meteorological observatory. It has been placed at the top of the castle of the Pecci family. The directorship of this establishment, which will be one of the most important in the whole Italian system, has been given to Count Lodovico.

WE are pleased to receive the first official publication issued from the Hong Kong Observatory by Dr. Doberck, giving the results of observations during the month of January. We are sure the establishment of this institution will be of the greatest service both to navigation and to science.

THE first International Ornithological Congress ever held was on Monday festively inaugurated at Vienna by its patron, the Crown Prince Rudolph—himself a noted ornithologist. In his opening speech, the Prince dwelt upon the great importance of those studies in natural history which characterise this century, a remark which was doubtless meant as a reply to the vehement attacks on modern science recently made by the Clerical Deputy Greuter in the Austrian Parliament. Germany and Austria have sent hither all their ornithological celebrities; but the Congress also includes delegates from the Russian and French Governments, and members from Switzerland, Holland, and Sweden. Even Siam and Japan are represented, while Eng-

land is conspicuous by her absence. The Congress began its deliberations with the question of International Protective Legislation for Birds.

THE sixth Archæological Congress will be held at Odessa from August 27 to September 1.

A SOMEWHAT novel feature in connection with the International Health Exhibition this year will be the establishment of a library and reading-room, a home for which the executive council have assigned in a large double room in the Albert Hall, overlooking the conservatory. Steps have been taken to secure a representative collection of works on vital statistics; of reports and regulations relating to public health; of regulations with reference to injurious trades and of works thereon; and of reports, statistics, and other works on the science of education. Foreign powers have been invited to lend their cooperation in this effort to create an international library of works of reference bearing on the two divisions of the Exhibition, and several responses have already been received. India and the Colonies have also been asked to contribute towards the same end. Publishers and authors have likewise been invited to forward copies of their works. In addition to the library of reference, there will be a reading-room, to which the current numbers of periodical publications of a sanitary or educational character will be admitted. All books and periodicals sent to the library and reading-room will, under certain regulations, be arranged for the use of visitors, and not merely for exhibition. The books will be submitted to the jurors, and a full catalogue will be issued. All parcels for the library and reading-room should be addressed, carriage paid, to the Secretary of the Library Sub-Committee, Royal Albert Hall, London, S.W. The following handbooks are being written in connection with the Exhibition:—"Healthy Villages" (illustrated), by H. W. Acland, C.B., M.D., F.R.S.; "Healthy Bed-Rooms and Nurseries, including the Lying-in Room," by Mrs. Gladstone; "Healthy and Unhealthy Houses in Town and Country" (illustrated), by Mr. W. Eassie, C.E., with an appendix by Mr. Rogers Field, C.E.; "Healthy Furniture and Decoration" (illustrated), by Mr. R. W. Edis, F.S.A.; "Healthy Schools," by Mr. Charles Paget, M.R.C.S.; "Health in Workshops," by Mr. J. B. Lakeman; "Manual of Heating, Lighting, and Ventilation" (illustrated), by Capt. Douglas Galton, C.B., F.R.S.; "Food," by Mr. A. W. Blyth, M.R.C.S.; "Principles of Cookery," by Mr. Septimus Berdmore; "Food and Cookery for Infants and Invalids," by Miss Wood, with a preface by R. B. Cheadle, M.D., F.R.C.P.; "Drinks, Alcoholic," by John L. W. Thudichum, M.D., F.R.C.P.; "Drinks, Non-Alcoholic and Aërated," by John Attfield, Ph.D., F.R.S.; "Fruits of all Countries" (illustrated), by Mr. W. T. Thiselton Dyer, M.A., C.M.G.; "Condiments, including Salt," by the Rev. J. J. Manley, M.A.; "Legal Obligations in respect to Dwellings of the Poor," by Mr. Harry Duff, M.A., Barrister-at-Law, with a preface by Mr. Arthur Cohen, Q.C., M.P.; "Moral Obligations of the Householder, including the Sanitary Care of his House," by G. V. Poore, M.D., F.R.C.P.; "Laboratory Guide to Public Health Investigation" (illustrated), by W. W. Cheyne, F.R.C.S., and W. H. Corfield, M.D., F.R.C.P., M.A.; "Physiology of Digestion and the Digestive Organs," by Prof. Arthur Gamgee, F.R.S.; "Fermentation," by Dr. Duclaux, with a preface by M. Louis Pasteur, Membre de l'Institut; "Spread of Infection," by Mr. Shirley F. Murphy; "Fires and Fire Brigades" (illustrated), by Capt. Eyre M. Shaw, C.B.; "Scavengering and other such Work in Large Cities," by Mr. Booth Scott; "Athletics," Part I. (illustrated), by the Rev. E. Warre, M.A.; "Athletics," Part II., by the Hon. E. Lytton, M.A., and Mr. Gerard F. Cobb, M.A.; "Dress in relation to Health and Climate" (illustrated), by Mr. E. W. Godwin, F.S.A.; "The

Ambulance" (illustrated), by Surgeon-Major Evatt, M.D., A.M.D.; "The Influence of Schools of Art on Manufacturing Industry," by John Sparkes; "The Homes of the Poor," (author not yet settled).

LADY SIEMENS has placed at the disposal of the Council of the Society of Arts a sum of 20*l.*, to provide a prize, to be called the Siemens Prize, to be offered for the best application of gas to heating and cooking in dwellings (Class 24 in the International Health Exhibition). The prize will consist of a gold medal or 20*l.*, and will be awarded under the same conditions as the prizes announced in the *Journal of the Society of Arts* of the 14th inst.

THE Senkenberg Natural History Society at Frankfort has had a legacy of 40,000*l.* left to it by the late Countess Bose.

A HUMAN skull has just been discovered in a bed of clay near Podbaba in the neighbourhood of Prague. A few days previously a mammoth tusk was found in the same locality. The colour of the skull proves that it was lying in yellow diluvial loam. It is remarkable on account of its very flat forehead and the thickened eyebrow bones, thus closely approaching the well-known Neanderthal skull. Its facial angle seems to be even smaller than that of the latter, although an exact measurement is impossible on account of the absence of part of the jaw-bones. Further details on the subject will be published in the *Transactions of the Bohemian Academy of Sciences*.

THE first number has just been issued of a new Italian quarterly, entitled *La Nuova Scienza, Rivista dell' Istruzione Superiore*, edited by Prof. Enrico Caporali of Todi, Umbria. As implied by the title, the aim of this periodical is to popularise scientific subjects, and to chronicle the progress of discovery in Italy and abroad. The editor invites communications in the chief European languages, and declares that his efforts will be mainly directed to promoting the unification of the sciences with a view to the ultimate constitution of an exact philosophy. To the present number he contributes two spirited and learned papers on "Modern Thought in Italy," and on "The Pythagorical Formula of Cosmic Evolution." The appearance of such a publication in a small provincial town is itself a striking illustration of the general revival of serious studies since the establishment of political unity in Italy.

THE much discussed question as to the purification of water in rivers "by itself," that is, by the mere fact of its motion, seems to have entered into a new phase. Dr. Pehl, at St. Petersburg, has recently made a series of bacterioscopic measurements on the waters of the capital, which are summed up in the last issue of the *Journal of the Russian Chemical Society*. The water of the Neva itself appears to be very poor in bacteria, namely, 300 germs in a cubic centimetre. After heavy rains this number rises to 4500, and to 6500 during the thawing of the river. The canals of St. Petersburg, on the contrary, are infected with bacteria, their number reaching 110,000 in a cubic centimetre, even during good weather. The same is true with regard to the conduits of water for the supply of the city. While its chemical composition hardly differs from that of the Neva (by which they are supplied), the number of bacteria reaches 70,000, against 300 in the water freely taken from the river; and the worst water was found in the chief conduit, although all details of its construction are the same as in the secondary conduits. Dr. Pehl explains this anomaly by the rapidity of the motion of water, and he has made direct experiments in order to ascertain that. In fact, when water was brought into rapid motion for an hour, by means of a centrifugal machine, the number of developing germs was reduced by 90 per cent. Further experiments will show if this destruction of germs is due to the motion of the mass of water, or to molecular motion. The germs, among

which Dr. Pehl distinguishes eight species, are not killed by immersion into snow. As the snow begins to fall it brings down a great number of germs, which number rapidly diminishes (from 312 to 52 after a three hours' fall of snow, on January 21, 1884), while their number on the surface of the snow increases, perhaps in consequence of the evaporation of snow or of the condensation of vapour on its surface.

IT is proposed, *Science* states, to establish a monthly *American Meteorological Journal*. It will begin with from twenty-four to thirty-two octavo pages, and will be enlarged as rapidly as is justified by the support given it. The first number will probably appear about May 1. It will be published in Detroit by Dr. W. H. Burr, and edited by Prof. M. W. Harrington of Ann Arbor.

IT is stated that the earthquakes of March 25 in Southern Hungary were also severely felt at Esseg, at Winkowze, and at Fünfkirchen. At Djakovar many houses were injured. Another earthquake was remarked at Ischia on March 28. The shock was but a slight one and of short duration.

FROM the Report for 1883 of the Glasgow Museum we see that it had 223,129 visitors during the year. There were large additions to the Natural History Department during the year.

WE have already noticed M. Erkert's anthropological measurements in the Caucasus. He publishes now in the *Izvestia* of the Tiflis Geographical Society (vol. viii.) his further measurements and conclusions. The different nationalities appear as follows with regard to their cephalic indexes:—Only the Aderbajjan Tartars are mesocephalic (79·4), all others being brachycephalic, the indexes being 80·9 with the Kalmucks, 81·4 with the Ossets, 81·9 with the Adighe and Chechenes, 83·2 with the Little-Russians, 83·7 with the Georgians, and 85·6 with the Armenians. A high index was found for the Lezghines, but the number of measurements was only three. As to the height of the skull the Aderbajjan Tartars have the highest and longest heads; the Armenians the shortest and highest (71·1); the Kalmucks the longest but lowest (62·0); while the Little-Russians, the Adighe, and the Georgians afford intermediate types, the heights of their skulls varying from 67·6 to 66·7. All the above nationalities have relatively low and broad or chamäprosopous faces, there being, however, a number of individuals with long or leptoprosopous faces, especially among the Tartars. In connection with the above it may be worth noticing the measurements of M. Chantre of Lyons, published in the *Bulletin de la Société d'Anthropologie de Lyon* for 1883. It results from his measurements made on 137 Kurd men and 21 women, that their cephalic index is 81·4; they are thus brachycephalous, and sometimes mesaticephalous. The index increases with those Kurds who live close by Armenians, and decreases with those who live close by Bedouins. Altogether the memoir of M. Chantre ("Aperçu sur les caracteres ethniques des Anshariés et des Kourdes") is an important addition to our knowledge of Kurdistan, as well as his second memoir, published in the same serial, on the Stone and Bronze Ages in Western Asia, Syria, Mesopotamia, Kurdistan, and the Caucasus.

IT appears from the Caucasian *Izvestia* that the Russian Amudaria Expedition has arrived at the following conclusions:—The I han branch of the delta of the Amu could be easily made navigable; as to the possibility of bringing the water of the Amu to the Caspian, General Glukhovsky's Commission does not yet give a definite answer, but it considers it most probable. The immense and deep depression of Sary-kamysh could be turned by the canal; the necessary inclination of level exists; and the immense desert west of Khiva could be irrigated without difficulty and without loss to the oasis of Khiva.

IN the letter signed "O. S." last week (p. 525), under the heading "Remarkable Sunsets," the French term should be *pelure d'oignon* and not *velure*.

THE additions to the Zoological Society's Gardens during the past week include a Macaque Monkey (*Macacus cynomolgus* ♂) from India, presented by Mrs. F. Mortimer; two Secretary Vultures (*Serpentarius reptilivorus*) from South Africa, presented by the Rev. G. H. R. Fisk, C.M.Z.S.; a Blue-and-Yellow Macaw (*Ara ararauna*) from South America, presented by Mr. H. W. Kingdom; two Common Peafowls (*Pavo cristatus* ♂ ♀) from India, presented by Mr. R. F. J. Cobbett Allen; a Common Viper (*Vipera berus*, black variety) from Hampshire, presented by Lord Londesborough, F.Z.S.; a Yaguarundi Cat (*Felis yaguarundi*) from South America, a Leuhdorf's Deer (*Cervus leuhdorfi* ♂) from Amoorland, two Jardine's Parrots (*Psephenus gulielmi*) from West Africa, three Rhinoceros Hornbills (*Buceros rhinoceros* ♂ ♀ ♀) from the Malay Peninsula, two Nepal Hornbills (*Aceros nepalensis* ♂ ♂), a Green Cochoa (*Cochoa viridis*), two Nepal Tree Pies (*Dendrocyitta nepalensis*), a Gray-headed Thrush (*Turdus castanea*) from Nepal, three Bronze Fruit Pigeons (*Carpophaga aenea*), two White-breasted Gallinules (*Gallinula phœnicura*) from India, two White-backed Pigeons (*Columba leuconota*) from the Himalayas, seven Waxwings (*Ampelis garrulus*), two Proteus (*Proteus anguinus*), European, purchased; a Lucian's Parrakeet (*Pulicornis luciani*) from China, a Geoffroy's Dove (*Peristera geoffroyi* ♂) from Brazil, received in exchange.

OUR ASTRONOMICAL COLUMN

COMET 1884 a.—The comet notified by telegram from Mr. Ellery as having been discovered in the constellation Grus, appears to have been detected by Mr. Ross, a young amateur astronomer residing at Elsterwick, near Melbourne, on January 7. Observations were commenced at Melbourne on January 12, and were continued to February 4, when the comet had become very faint. The positions, as first communicated to the *Astronomische Nachrichten*, contained more than one obvious error, and generally (according to a comparison made by Dr. Kreutz with an orbit since received from Melbourne) appear to be strangely inaccurate, a circumstance that will probably have caused useless expenditure of time to computers. We subjoin the Melbourne orbit with one calculated by Mr. Hind from the observations on January 12 and 28 and February 4, as they are printed in *Astron. Nach.*, No. 2579:—

	Melbourne		Hind
Perihelion passage, 1883, Dec. 25	78°38	Melb. M.T. ...	Dec. 25 4998 G.M.T.
Longitude of perihelion ...	125 15 55	...	124 14 4
" " ascending node ...	265 12 15	...	265 56 5
Inclination ...	64 53 16	...	64 59 7
Log. perihelion distance...	9.502384	...	9.51838
Motion—Retrograde.			

It is to be remarked that Dr. Kreutz, calculating from the Melbourne orbit, does not reproduce the extreme positions stated to have been employed in its computation.

VARIABLE STARS.—On comparing the late Prof. Julius Schmidt's determinations of the times of minima of *Algol* in 1883 with the formula given by Prof. Schönfeld in his second catalogue of variable stars, it will be found that, by a mean of the observations between August 14 and December 4, the formula gives the minimum too late by fifty-eight minutes. The mean annual errors for the period 1876–83 have shown irregularity, but the separate results within the same year differ considerably.

Mr. Baxendell has worked out new elements for R Arietis from his own observations 1859–81. He finds for—

	Days
Maximum ... Epoch 1866, Sept. 1.3 + 186.71 E.	
Minimum ... Epoch 1870, Jan. 2.3 + 186.63 E.	

The mean interval from maximum to minimum is 99.0 days, and from minimum to maximum 87.7 days.

THE OBSERVATORY, CINCINNATI.—The seventh part of the publications of this Observatory has appeared. Parts 4, 5, and

6 were devoted by Mr. Ormond Stone to the double-star measures made with the 11-inch refractor in the years 1877–80. In the new part are given the observations of comets in the years 1880–82, including numerous physical observations as well as observations for position. There is a comparison with theory of the phenomena in the tail of the great comet of 1882. In a number of plates are illustrated the telescopic and naked-eye appearance of the great comets of 1881 and 1882 and of the first comet of the latter year.

Mr. H. C. Wilson is in temporary charge of the Cincinnati Observatory, Mr. Ormond Stone having been appointed Professor of Astronomy in the University of Virginia, and Director of the Leander McCormick Observatory.

THE "ASTRONOMISCHE GESELLSCHAFT."—The fourth part of the eighteenth volume of the *Transactions* of this Society is issued. It contains the proceedings at the meeting held in Vienna in September last and the usual critical notices of recent astronomical publications; also reports on the progress of the zone-observations from thirteen observatories. It was decided to hold the next meeting at Geneva in 1885; Prof. Auwers was chosen president for the second time, with Prof. Gylden as vice-president, and Profs. Schönfeld and Seeliger (now at Munich) as secretaries.

PHYSICAL NOTES

THE transition-resistance supposed by Poggendorff to exist in electrolytic cells between the surface of the electrode and that of the electrolyte in contact with it has lately been investigated with great care by Prof. J. Gordon Macgregor in solutions of very pure zinc sulphate, using electrodes of amalgamated zinc. The conclusion arrived at was that such a transition-resistance, if it exists at all, is less than 0.0125 of an ohm.

IN another paper which appears in the *Transactions of the Royal Society of Canada* Prof. Macgregor describes an ingenious arrangement devised by him for measuring on Wheatstone's bridge the re-istances of electrolytes. He employs alternate currents produced by a rotating commutator inserted in the circuit of two Daniell's cells; and in order to use with this arrangement an ordinary mirror-galvanometer, he recomputes the currents in the galvanometer circuit by means of a second commutator rotating on the same axle as the first.

THE annual *conversations* of the Société de Physique, of Paris, will be held this year on April 15 and 17 respectively, the former being limited strictly to the members of the Society. These meetings will, by the invitation of Admiral Mouchez, be held in the Observatoire.

A NOTE on Hall's effect was recently read at a meeting of the Physical Society of London by Prof. S. P. Thompson and Mr. C. C. Starling. They find that when a large sheet of foil is used, and placed symmetrically in a concentrated field between pointed magnetic poles, so that the junctions and connections are quite outside the influence of the field, Hall's effect is not produced. They find, however, an alteration in the equipotential lines of the current in the strip where it is magnetised, and have traced this effect to a change in the resistance. Strips of gold and tin show a decrease, strips of iron a slight increase of resistance when subjected to a strong magnetic field.

ANOTHER paper on Hall's effect appears in the current number of the *Journal de Physique* from the pen of M. Leduc. In this article M. Leduc draws a diagram of the equipotential lines, as, according to his ideas, they will be found to lie between the two "parasitical" electrodes. It does not appear whether he has verified his views by actual determinations of the position of the lines of equal potential.

ROWLAND's famous experiment demonstrating the magnetic action of electric convection has been called in question by Dr. E. Lecher of Vienna. In Rowland's original experiment the electrified rotating disk was horizontal, and the magnetic needle, protected from electrostatic influences by being enclosed in a metallic case, was held over the disk at a point near the circumference. Dr. Lecher, in attempting to repeat the experiment, placed the rotating disk in a vertical plane, its axis being horizontal; the magnet needle was placed parallel to the plane of the disk and in the axis of its rotation in fact relatively as the coil and needle of a Gaugain galvanometer. Disks of brass and of *papier-maché* covered with graphite were used, and charged